

NON-PUBLIC?: N
ACCESSION #: 9111140183
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Quad Cities Unit Two PAGE: 1 OF 05

DOCKET NUMBER: 05000265

TITLE: Inadvertent Opening Of Electromatic Relief Valve 2-203-3C Due To
Binding In The Pilot Valve Assembly.
EVENT DATE: 10/07/91 LER #: 91-012-00 REPORT DATE: 11/05/91

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 3 POWER LEVEL: 001

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Raj Rawal, Ext. 2943 TELEPHONE: (309) 654-2241

COMPONENT FAILURE DESCRIPTION:
CAUSE: X SYSTEM: SB COMPONENT: RV MANUFACTURER: D245
REPORTABLE NPRDS: Y

SUPP
PLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

At 0223 hours on October 7th, 1991, Unit Two was in the Startup mode at 1 percent rated reactor core thermal power. When the reactor RCT! RPV! reached approximately 63 psig, a spurious actuation of Electromatic Relief Valve (ERV) RV! 2-203-3C occurred. At 0253 hours, Unit Two was manually scrammed and cooldown was initiated. Later, when a Drywell entry was made, the pilot valve V! for the 2-203-3C was found stuck open.

The cause of this event was binding of the pilot valve for the 2-203-3C ERV. The Mechanical Maintenance Department replaced the pilot valve internals for each ERV as a precautionary measure. On October 7th 1991, at 1912 hours, the ERV's were stroked manually and tested successfully. Unit Two startup was initiated at 2054 hours on October 7th, 1991. QCOS 203-3, Main Steam Valves Operability Test, was performed on October 8th,

1991 at 1020 hours, and the ERV declared operable.

This report is being submitted in accordance with 10CFR50.73(a)(2)(iv).

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END OF ABSTRACT

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PLANT AND SYSTEM IDENTIFICATION:

General Electric - Boiling Water Reactor - 2511 MWt rated core thermal power.

EVENT IDENTIFICATION: Inadvertent opening of Electromatic Relief Valve 2-203-3C due to binding in the Pilot Valve Assembly.

A. CONDITIONS PRIOR TO EVENT:

Unit: Two Event Date: October 7, 1991 Event Time: 0223
Reactor Mode: 3 Mode Name: STARTUP Power Level: 01%

This report was initiated by Deviation Report D-4-02-91-073.

Startup/Standby Mode)3) - position, the reactor protection trips, initiated by condenser low vacuum and main steamline isolation valve closure are bypassed, the low pressure main steamline isolation valve closure trip is bypassed and the reactor protection system is energized, with IRM and APRM neutron monitoring system trips and control rod withdrawal interlocks in service.

B. DESCRIPTION OF EVENT:

On October 7th, 1991, at 0223 hours, Unit Two was in the STARTUP mode at 1 percent rated core thermal power. Operations personnel were performing QGP 1-1, Normal Unit Startup. When the reactor pressure reached approximately 63 psig, Electromatic Relief Valve (ERV) 2-203-3C spuriously actuated. The acoustic monitor MON! actuated and tailpipe temperature increased to indicate the ERV was open. Torus water level and torus temperature also showed an increase. On October 7th, 1991, at 0253 hours, Unit Two was manually scrammed per QCOA 203-1, "Stuck Open Relief Valve," and cooldown initiated.

Previous to this, on October 5, 1991, the pilot valve had been manually stroked while the reactor RCT! RPV! was not at pressure. This was done in preparation for the Unit startup to verify the proper operation of the pilot valves. After the valve was stroked, control room indication showed it to be closed.

NRC notification was completed on October 7, 1991, at 0326 hours to comply with 10CFR50.72(b)(2)(ii).

At approximately 0340 hours, a Maintenance Foreman entered the drywell at 35 psig reactor pressure. At this time, he found the pilot valve for the ERV was stuck open. The Foreman manually closed the pilot valve, and the main valve subsequently closed.

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On October 7th, 1991, the Mechanical Maintenance Department replaced the pilot valve internals for all four ERV's under Work Requests Q95629, Q95630, Q95631, Q95632. On October 7th, 1991, at 1912 hours, Unit Two ERV pilot valves were stroked successfully, and then visually verified to be in the closed position. Unit Two startup was initiated at 2054 hours on October 7th, 1991.

On October 8th, 1991, at 1020 hours, the Operating department completed QCOS 203-3, Main Steam Relief Valve Operability Test. The ERV was subsequently declared operable.

C. APPARENT CAUSE OF EVENT:

This report is provided to satisfy the requirements of 10CFR50.73(a)(2)(iv). The licensee shall report any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS) JC!.

The cause of the inadvertent ERV actuation was binding of the pilot valve assembly. The spring cover in the pilot valve assembly bound up against the solenoid support bracket, causing the pilot valve stem to remain partially lifted.

The cause of the binding is uncertain. The clearance between the spring cover and the solenoid support bracket is small. There are various areas in the assembly in which misadjustment or improper clearances could result in the spring cover binding with the

solenoid bracket. Any of these possibilities, coupled with normal system vibration, thermal changes, or other outside disturbances, could have resulted in the valve binding.

The solenoid bracket is mounted with four bolts, and can be attached in four different positions. One possible cause for the binding is an improper alignment of this support. Maintenance personnel stated that they felt the bolt holes were not quite symmetrical in their placement. This could lead to insufficient clearance between the spring cover and the support depending on how the support is oriented.

According to work records, the pilot valve had been replaced on January 22, 1991. The pilot valve was stroked successfully twice on January 22, 1991, with the reactor at pressure. It was also stroked successfully on April 7, 1991, with the reactor at pressure, for semi-annual operability testing.

A contributing factor to this event is the design on the ERV pilot valve position indication, which prevented detection of the stuck open pilot valve prior to startup. Control room indication for the ERV position comes from its solenoid assembly. On October 5, 1991, the pilot valve stuck partially open when the solenoid was deenergized. The control room indication showed the ERV to be closed, based on the fact that the solenoid was deenergized. The ERV subsequently lifted with system pressure increased during startup due to the binding of the pilot valve.

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The ERV pilot valves were stroked on October 5, 1991 under an addition to QGP 1-S3, Master Outage Checklist. This task is performed after maintenance has been done on the valves, or when QCOS 203-3 is to be performed. The performance of this task while the reactor was not at pressure resulted in the stuck open pilot valve going undetected. A stuck open pilot valve would be detectable if the reactor was at pressure, because the ERV would not reseal.

D. SAFETY ANALYSIS OF EVENT:

The safety significance for this event is minimal. Technical Specification 3.5.D.1 states that, "The automatic pressure relief subsystem shall be operable whenever the reactor pressure is greater

than 90 psig, irradiated fuel is in the reactor vessel and prior to reactor startup from a cold condition."

Since reactor pressure never exceeded 90 psig during this event, the ADS System was never required to ensure that the reactor vessel could be depressurized to allow low pressure ECCS injection in the event of a DBA LOCA.

The Residual Heat Removal (RHR) BO!, and Core Spray BM! Systems were available at all times during the occurrence to supply water to the reactor vessel. Reactor feedwater was adequate to control level during the event.

The reactor relief valves are located on the steam lines upstream of the first isolation valve, and discharge directly to the torus through dedicated relief valve discharge lines. The torus local peak temperature sensor indicated a temperature rise of less than 10 degrees Fahrenheit. The Torus water level recorder LR! indicated a rise of 1.2 inches. These parameters remained within Technical Specification limits at all times.

E. CORRECTIVE ACTIONS:

The immediate corrective action was to scram Unit Two. The pilot valve was subsequently closed manually. The pilot valve for 2-203-3C ERV was then replaced. Additionally, the pilot valve internals for the 2-203-3B, 3D, and 3E electromatics were replaced as a preventive measure. After the replacement of the pilot valve internals, Mechanical Maintenance verified that there was adequate clearance between the spring cover and the solenoid bracket. All the ERV's were stroked and tested successfully on October 7, 1991.

Discussions concerning maintenance techniques on the ERVs were held with Dresden station on October 29, 1991. Dresden has historically experienced fewer problems with their ERVs. Dresden maintenance procedures will be reviewed, and any improvements to our maintenance techniques identified during this review will be incorporated into our maintenance procedures. Specific instructions will be included to verify that the pilot valve can stroke freely (NTS# 2652009107301).

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In order to reduce the possibility of a stuck pilot valve going

undetected while the reactor is not at pressure, QGP 1-S3 will be revised. A step will be added to visually verify the ERV pilot valve positions prior to pressurizing the reactor if the pilot valves were stroked while the reactor was not at pressure (NTS# 2652009107302).

F. PREVIOUS EVENTS:

There have been three previous events involving stuck open ERVs since 1980. All three of the failures resulted in the manual shutdown of the reactor. Two of these three failures were attributed to steam cutting or binding of the pilot valve spool. The other event was due to plugging of the drain orifice.

(1) DVR 4-1-89-31
LER No. 89-004

"While performing QOS 0201-S1, Automatic Pressure Relief System Manual Operation of Relief Valves. The 1-203-3D valve stuck open." Numerous attempts were made to close the valve, but were unsuccessful. The Reactor was manually scrammed per procedure. The valve remained open and depressurized the Reactor to the suppression pool.

(2). DVR-4-1-83-050
LER No. 82-23

"Auto Blowdown Valve 1-203-3E Stuck Open." The 1-203-3E relief valve came open at 60 psig during start up. The valve could not be closed and reactor was scrammed. The cause was a binding pilot valve.

(3). DVR 4-1-80-058
LER No. 80-20

"Electromatic Relief Valve 102-3-3B Failed to Close." Scrammed the reactor during shutdown for refuel outage because 1-203-3B stuck open due to excessive steam cutting on pilot valve seat. The relief valve reclosed at 190 psig.

A Nuclear Plant Reliability Data System (NPRDS) search found six reportable events involving Dresser valves failing open at the three other nuclear stations that have Dresser ERV's. Five of the failures were due to the pilot valve not reseating properly. The other failure was due to dirt on the seating surface of the main disc valve.

G. COMPONENT FAILURE DATA.

Valve 2-203-3C is a 6-inch ERV manufactured by Dresser Industries Inc., Model Number 1525-VX.

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Telephone 309/654-2241

RLB-91-262

November 4, 1991

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Reference: Quad Cities Nuclear Power Station
Docket Number 50-265, DPR-30, Unit Two

Enclosed is Licensee Event Report (LER) 91-012, Revision 00, for Quad Cities Nuclear Power Station.

This report is submitted in accordance with the requirements of the Code of Federal Regulations, Title 10, Part 50.73(a)(2)(iv). The licensee shall report any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature.

Respectfully,

COMMONWEALTH EDISON COMPANY
QUAD CITIES NUCLEAR POWER STATION

R. L. Bax
Station Manager

RLB/TB/plm

Enclosure

cc: J. Schrage
T. Taylor
INPO Records Center
NRC Region III

STMGR 219

*** END OF DOCUMENT ***
